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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,028	07/22/2003	Raja Banerjee	9	9533
7590 08/17/2005			EXAMINER	
Ryan, Mason & Lewis, LLP			DEPPE, BETSY LEE	
90 Forest Avenue			ART UNIT	PAPER NUMBER
Locust Valley, NY 11560			2637	

DATE MAILED: 08/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,028

Applicant(s)

BANERJEA, RAJA

Examiner

Betsy L. Deppe

Art Unit

2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/30/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see pages 3-4, filed December 1, 2004, with respect to the rejection(s) of claim(s) 1, 13 and 21 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Koslov et al. (US Patent No. 5,940,450).

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the Viterbi decoder recited in claim 10 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because it includes form and legal phraseology often used in patent claims, such as "comprises." Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities: on pages 5 and 9, "DOUT and DIN" should be "D_{OUT}" and "D_{IN}," respectively, in order to be consistent with the drawings. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. Claims 1-6, 8-16 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belotserkovsky et al. (US Pub. No. 2004/0001427 A1, cited in the Office Action mailed August 27, 2004) in view of Koslov et al. (US Patent No. 5,940,450).

7. With regard to claims 1 and 13, Figure 3 of Belotserkovsky et al. discloses the claimed invention including a demodulator (e.g. 28, 30, 32, 34), a carrier frequency offset compensation circuit (64) (wherein adjusting the frequency inherently/implicitly changes the phase of the input signal), a transformation circuit (46), and an equalizer (68). (See [0025]-[0033]) However, Belotserkovsky et al. does not teach a CFO estimation circuit as recited in claim 1, lines 11-15.

Koslov et al. discloses a frequency error detection circuit (see "302" in Figures 3 and 4) carrier recovery method that estimates frequency error by determining the difference in phase errors between two symbols. (See "412" in Figure 4 and column 7, lines 15-30) Since Belotserkovsky et al. implies that different error metric computations may be used for adjusting the carrier frequency offset (for example, see "One example of an error" in [0028]), it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the frequency error estimation circuit disclosed by

Koslov et al. in order to improve carrier recovery and achieve frequency lock in less time. (See Koslov et al. column 4, lines 14)

Since the steps recited in claim 13 correspond to the limitations recited in claim 1, Belotserkovsky et al. in view of Koslov et al. also discloses the claimed invention.

8. With regard to claims 2 and 14, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including using consecutive symbols. (See Koslov et al., column 7, lines 15-18)

9. With regard to claims 3 and 15, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including a fast Fourier Transform circuit. (See Belotserkovsky et al., 46 in Figure 3)

10. With regard to claims 4 and 20, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention. Since carrier frequency adjustment circuit (64) in Belotserkovsky et al. receives the first control signal and Koslov et al. teaches that the carrier must also be adjusted in phase in order to accurately recover the carrier (see Koslov et al., column 2, lines 31-39), it would have been obvious to one of ordinary skill in the art at the time the invention was made to shift the phase of the symbol by the amount of the phase error difference in order to adequately compensate for carrier frequency offsets to recover the transmitted data.

11. With regard to claims 5, 6 and 16, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including a LPF (42, 44) between demodulator and CFO compensation circuit. (See Belotserkovsky et al., 42 and 44 in Figure 1)

12. With regard to claims 8 and 18, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including a slicer circuit. (See Koslov et al., 106 in Figure 3 and column 7, lines 11-14 and 46-67)
13. With regard to claim 9, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including a quadrature amplitude demodulator. (See Koslov et al., column 4, lines 32-35 106 in Figure 3)
14. With regard to claim 10, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including a Viterbi decoder after equalization. (See Belotserkovsky et al., [0023]) Since Viterbi decoding is a method of error correction, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the Viterbi decoder before the slicer circuit in order to improve data recovery.
15. With regard to claims 11 and 19, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including basing the first control signal on a difference between the data sample in the expected constellation and the sample in the measured constellation. (See Koslov et al., column 7, lines 56-67) Since the phase error difference signal requires the determination of each phase error signal and Koslov et al. teaches estimating a phase error signal between the incoming signal (i.e. "measured signal constellation") and the ideal signal (i.e. "expected signal constellation"), the first control signal is "based at least in part on a difference between the data sample in the measured signal constellation and the sample in the measured signal constellation," as recited in the respective claims.

16. With regard to claim 12, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention including using data symbols. (See Koslov et al., column 7, lines 11-30)

17. With regard to claim 21, Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention (as discussed above with regard to claim 1) except for implementing the circuit in a semiconductor device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the teachings of Belotserkovsky et al. in view of Koslov et al. in a semiconductor device in order for minimization and reliability.

18. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belotserkovsky et al. in view of Koslov et al. as applied to claims 1 and 13, respectively, above, and further in view of Jiang (US Pub. No. 2003/0231718 A1). Belotserkovsky et al. in view of Koslov et al. disclose the claimed invention except for a cyclic prefix decoder coupled between the CFO compensation circuit and the equalizer wherein the decoder removes the cyclic prefix.


Figure 4 of Jiang discloses a cyclic prefix decoder (403) coupled between a CFO compensation circuit (401) and a transformation circuit (404). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a cyclic prefix decoder to the circuit/method disclosed by Belotserkovsky et al. in view of Koslov et al. in order to reduce the amount of data processed by the transformation circuit and the equalizer.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Betsy L. Deppe whose telephone number is (571) 272-3054. The examiner can normally be reached on Monday, Tuesday and Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272 - 2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Betsy L. Deppe
Primary Examiner
Art Unit 2637